

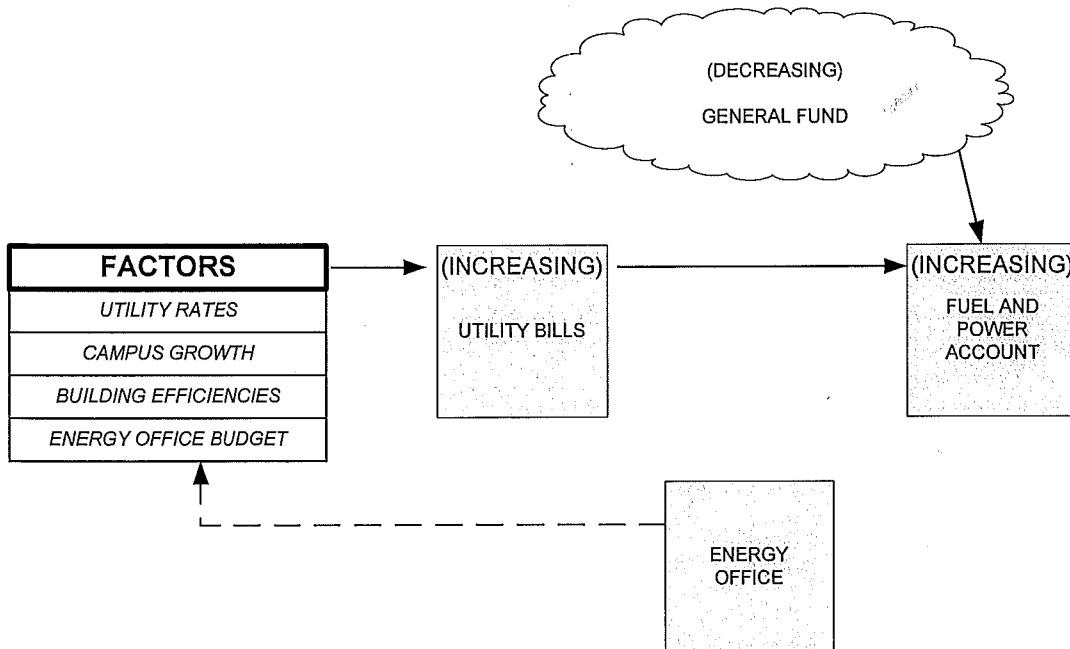
University of Utah Energy Office Proposal

October 9, 2007

Background

In 1998, the University of Utah entered into a performance contract with Viron Energy Services to retrofit buildings and construct a central chiller/high temperature water plant. When the five phases of this project were complete, it was determined to establish an energy office to ensure the performance of this project, identify other energy management opportunities, provide analytical support, and handle the metering side of Plant Operations' utility billings.

Since 1998, the energy office has been using the following model:



This model shows that various factors affect the University's utility bills. As the bills increase, funds are reallocated from the General University Funds to the fuel and power account to compensate. This reallocation reduces the available funding used for other University programs and projects. Energy management is being performed, but there are no resources to correct the factors that are causing the increases.

Current Work

Various efficiency and energy reduction projects/programs have been initiated since 1998. A brief list includes:

- Performance Contracting.
- Behavioral Energy Program
- Retro-commissioning of buildings 533, 570.
- Miscellaneous Energy Reduction Projects

These activities of the Energy Office have generated significant savings (and very positive PR) over the past six years. The credits/savings, on an annual basis, are as follows:

• Net Annual Performance Contract Savings ¹	\$650,000	
• Net Annual Behavioral Savings ¹	\$600,000	
• Retro-Commissioning Savings	\$ 84,000	
• <u>Misc. Energy Reduction Projects</u>	<u>\$209,000</u>	
	\$1,543,000	<i>(excess savings)</i>

- 1) The performance and behavioral savings referenced above is the net excess savings only. Net excess savings is calculated by subtracting the contractual costs of the performance or behavioral contracts from the energy cost savings.

The savings of \$1,250,000 from the performance contract and the behavioral program are to continue to be used to repay current financing. The \$293,000 in savings from retro-commissioning and miscellaneous energy projects creates a potential source of funds for future energy efficiency activities that could be performed that would reduce the energy consumption requirements of the University.

Many activities (lighting retrofits, retro-commissioning projects, energy studies) that could reduce energy consumption have been passed up due to lack of financial resources.

Another challenge faced is the availability of information used to drive continual energy reductions. These challenges include:

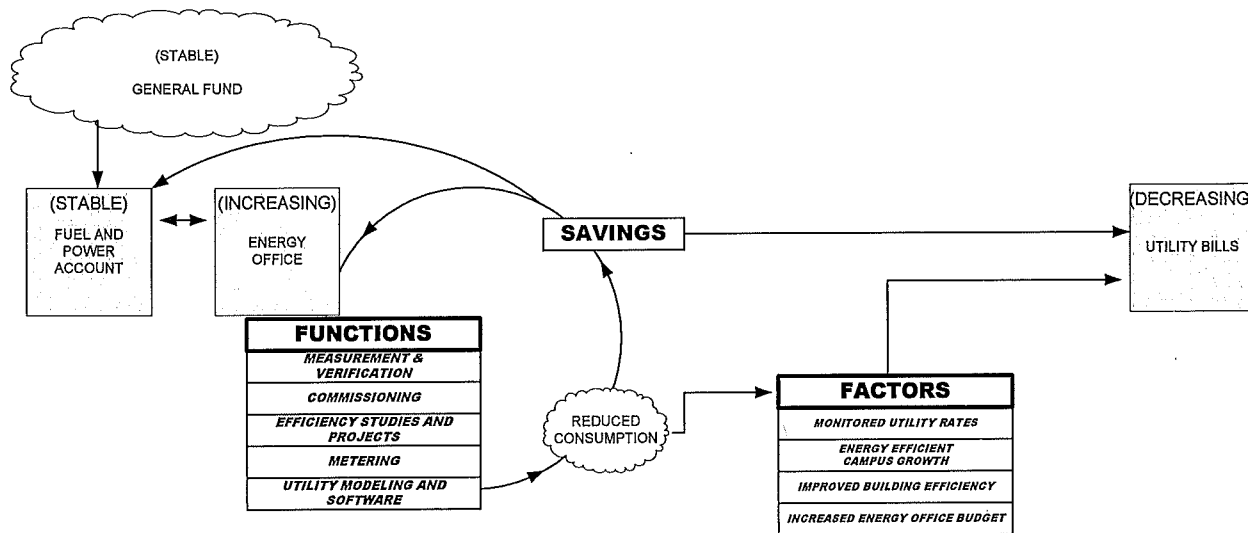
- Inadequate/ antiquated metering
- Lack of an automated energy management system.
- Inadequate analysis and storage of data.
- Lack of detailed studies of buildings and utility systems.

Energy Management Proposal

It is proposed that a shared-savings arrangement be implemented with the start of the 2008 Fiscal Year. These shared savings would be reinvested back by the Energy Office in future energy projects and programs. By performing these energy management functions, the factors that drive the increase in utility bills will be reduced. The new annual savings will then be divided and placed into both the Energy Office budget and the Fuel and Power Account

This model creates a compounding affect, which will further enhance our sustainable commitment to the taxpayers of Utah, the University, and to the environment. As the University continues to struggle with growth and increases in utility rates, the Energy Office continues to look for new opportunities to reduce consumption and increase efficiency. This model provides a more proactive approach that will further reduce the strain on the fuel and power account, reduce emissions, satisfy climate commitments and other sustainability initiatives, provide good billing and management information for campus customers, and establish the University of Utah as a leader in energy management.

The proposed process is demonstrated by the following flow diagrams.



Plant Operations will utilize 100% of the current costs for Measurement and Verification on the Chevron Energy Services Performance Contract for energy reduction activities and the hiring of an Energy Engineer. Plant Operations feels it would be beneficial to hire an energy engineer, where we can utilize his/her technical knowledge in functioning as a program manager, with many of the actual tasks being performed by sub-contractors. These energy-related activities create significant returns as demonstrated by our past projects as well as by independent research.

According to the Energy Systems Laboratory of Texas A&M; *commissioning of existing facilities, present energy saving opportunities upwards of 25%, while reconciling mechanical system performance shortfalls, occupant comfort issues, and potential Indoor Air Quality (IAQ) issues. The key to identifying these lost savings is a measurement plan based on real time system operational data.* (Getting a Better Performing Building: Commissioning and Real Time Data Analysis, 2002)

Plant Operations further proposes that 80% of the energy savings of recent and future implemented projects be used for a period of time to further identify and fund new energy initiatives and projects. Energy savings from new projects would be shared between the Fuel & Power account and the energy project for a period of time equal to the simple project cost payback. Energy projects would typically have less than a 7-year payback so the shared energy savings would be for a maximum of 7 years.

After that, 100% of the savings would benefit the Fuel & Power account. A mid-year and year-end report will be provided to the AVP, Budgets, identifying the activities and calculated performance of this program.

Additional to the energy savings, the Energy Office will seek to obtain other sources of funds. The current available sources are:

- Utility Companies (*Rocky Mountain Power, Questar Gas*)
- DFCM (*Energy Program Funds*)
- Other outside entities/Donors

Total Available Funds:

(based on historical averages)

• Performance and Behavioral	\$1,250,000	x	0%	=	\$0
• Measurement & Verification ²	\$220,000	x	100%	=	\$220,000
• New Projects ⁴	\$293,000	x	80%	=	\$234,000
• Utility Rebates/Credits ¹	\$270,000	x	100%	=	\$270,000
• State Contributions ³	<u>\$150,000</u>	x	100%	=	<u>\$150,000</u>
	<u>\$2,183,000</u>				<u>\$874,000</u>

- 1) Self-direct credits, as well as Finanswer credits, are generated on projects through Rocky Mountain Power's various incentive programs.
- 2) Measurement and verification (M&V) on the performance contract ensures the retrofits are performing as planned and are an essential component of all energy efficiency projects and programs. While the M&V process itself generates and maintains savings, the \$220,000 identified above represents termination of the current contract with Chevron Energy Solutions, and performing the M&V activities with either University staff and/or consultants.
- 3) Through established relationships with the State, we receive contributions to support our energy efficiency projects. This year, on the HPER lighting project alone, we will receive approximately \$150,000.
- 4) New projects include individual lighting retrofits, energy projects in news buildings and the replacement of variable frequency drives.

The Energy Office budget would then be allocated into several functions and activities. The bulk of the budget would be used to identify, study, and fund new energy saving projects. In this way the energy savings from projects creates more energy savings projects. The system funds itself until no new energy savings projects can be found. A portion of these activities are good business practices (such as M & V, utility analysis, and continuous commissioning) that should continue to be funded even if no new energy saving project is funded.

Budget

		F&P	OTHER	TOTAL
MEASUREMENT AND VERIFICATION	\$	110,000.00	\$ -	\$ 110,000.00
COMMISSIONING	\$	290,000.00		\$ 290,000.00
EFFICIENCY STUDIES AND PROJECTS	\$	220,000.00	\$ 150,000.00	\$ 370,000.00
METERING	\$	54,000.00		\$ 54,000.00
UTILITY MODELING AND ANALYSIS	\$	50,000.00		\$ 50,000.00
TOTALS	\$	724,000.00	\$ 150,000.00	\$ 874,000.00

Functions

Measurement and Verification:

- While we recommend terminating the M&V agreement with Chevron, it is essential to continue with this process. Studies have shown that eliminating monitoring will cause a 15 – 30% increase in energy consumption.
- The expense identified includes the cost of project management by University personnel as well as the cost associated with outside consulting services.

Commissioning:

- The commissioning process is essential for buildings to operate the way they were designed. This process, when performed on a regular basis, maintains efficiency in much the same way as a tune-up/scheduled maintenance for a car.
- We anticipate eight projects per year at an average of \$15,000 per commissioning study (\$120,000 annually), with measures being implemented by our shops or vendors with an estimated cost of \$160,000 - \$180,000 annually.

Efficiency Studies and Projects:

- This ranges from lighting retrofits to studying the feasibility of thermal energy storage.
- Complete studies and perform upgrade projects such as lighting retrofits. Based off previous year's expenses an annual expense of \$370,000 is estimated. These funds are a combination of additional state funds, utility rebates/credits, and University funds.

Metering:

- Plant Operations has identified the cost to upgrade and install new meters in the campus utility meter system at about \$1.5 million. Capital improvement dollars may be able to fund much of this activity. The additional funding required to keep the metering system updated could come from the shared savings of the Energy Office. At this time, we would budget \$54,000 for this activity.
- The preventive maintenance will be supported by the Utility Management Plan.

Utility Modeling and Analysis:

- In order to properly manage and analyze the massive quantities of data received from the campus utility meter system, a \$50,000 energy management software package is required in the first year.
- After the first year, completed studies and analysis of data collected by the energy management software package is budgeted to be \$50,000 annually to be used internally and for payment to outside energy firms.

With this funding the Energy Office will better manage the Fuel & Power account expenses. A log of projects with expiration of shared savings will be maintained for purposes of identifying Energy Office available funding.

Plant Operations requests that this management proposal be accepted and associated energy savings begin funding Energy Office functions this fiscal year. The program will grow and succeed to the extent new energy saving opportunities are identified and implemented.